

INSTITUTE OF SCIENCE & TECHNOLOGY

ASSIGNMENT QUESTION ODD SEM 2025

DIPLOMA-1ST SEM – (CST+EE+ME+CE)-THEORY

PAPER NAME : APPLIED CHEMISTRY

PAPER CODE : ACHEM

1. State and explain the postulates of Bohr's atomic model. What are its limitations?
2. Derive the expression for the energy of an electron in the hydrogen atom according to Bohr's theory.
3. Explain the concept of quantum numbers. How do they describe the position and energy of an electron in an atom?
4. Discuss the shapes of s, p, and d orbitals with neat sketches.
5. State and explain Heisenberg's Uncertainty Principle with an example.
6. Write a short note on photoelectric effect and its significance in atomic structure.

PAPER NAME : MATHEMATICS-I

PAPER CODE: MATH-I

1. Reduce to the standard form.

$$\left(\frac{1}{1-4i} - \frac{2}{1+i} \right) \left(\frac{3-4i}{5+i} \right)$$

2. Convert the following into the polar form:

$$\frac{1+7i}{(2-i)^2}$$

3. Let $z_1 = 2 - i$, $z_2 = -2 + i$. Find

$$\operatorname{Re} \left(\frac{z_1 z_2}{\bar{z}_1} \right)$$

4. Find the value of $\log_5 (1/25)$.
5. Find the values of k such that the equation $p/(x+r) + q/(x-r) = k/2x$ has two equal roots.
6. For what value of k do both the quadratic equations, $6x^2 - 17x + 12 = 0$ and $3x^2 - 2x + k = 0$, will have a common root?

PAPER NAME : APPLIED PHYSICS-I

PAPER CODE : APHY-I

1. Discuss about the different system of units.
2. What are the seven base units of measurement?
3. Describe 1 Ampere.
4. Discuss about the laws of limiting friction.
5. Define the terms:

6. Kinetic energy (b) Transformation of energy with examples
7. Define the terms:
8. Work (b) zero work (c) positive work (d) negative work
9. Discuss about the four different kinds of forces existing in nature.

PAPER NAME : COMMUNICATION SKILLS IN ENGLISH
PAPER CODE : CS

1. Describe the process of communication. Mention the types of communication.
2. State the barriers of communication.
3. What are soft skills and hard skills? Give examples.
4. State the importance of soft skills.
5. Write a paragraph drawing a comparison and contrast between a radio and television.
6. What is team work? What is a soft skill in C.V.?
7. Suppose you have been instructed by The Principal sir of your college to investigate the facilities in your college canteen. Now write a report with some recommendations.
8. In response to an advertisement write a job application to be sent to the General Manager, ABC company for the position of Junior Engineer in your field, having good academic and experience of 1 year.

DIPLOMA-1ST SEM – (CST+EE+ME+CE)-PRACTICAL
PAPER NAME : APPLIED CHEMISTRY LAB
PAPER CODE : LACHEM

1. How to prepare a standard oxalic acid and standard potassium dichromate solution.
2. Describe the volumetric estimation of total acid number (TAN) of given oil.
3. How to determine the strength of given sodium hydroxide solution by titrating against standard oxalic acid solution and phenolphthalein as indicator.

PAPER NAME : APPLIED PHYSICS-I LAB
PAPER CODE : LAPHY-I

1. Discuss about the measurement of the volume of the material of a given hollow cylinder.
2. Explain the procedure to determine the radius of curvature of the surface of a convex and concave mirror using spherometer.
3. Describe Viscosity of a liquid.

PAPER NAME : COMMUNICATION SKILLS IN ENGLISH LAB
PAPER CODE : LCS

1. What do you know by public speaking?
2. What are the do's and don'ts for group discussion?
3. Define proxemics, and kinesics. Mention types of proxemics.

PAPER NAME: ENGINEERING GRAPHICS

PAPER CODE: EG

1. Write the following letters in 6:5ratio,single stroke type with letter height of 18mm.
2. Divide a circle of 70mm diameter in to 24 equal sectors using the set square only.
3. Construct a vernier scale to read cm and up to 4m having a scale factor .04. Mark a distance of 2.36m on it. Construct an ellipse having major axis 100 mm and minor axis 70 mm.
4. The major and minor axes of an ellipse are 80mm and 60mm respectively. Draw half of the ellipse by concentric circle method and other half by oblong method.

PAPER NAME: ENGINEERING WORKSHOP

PAPER CODE: EW

1. What are common materials used for pattern making? Discuss advantages and disadvantages of wood using pattern making.
2. Classified drill. Sketch a twist drill and named it various parts.
3. What are the procedures commonly done in bench working and fitting shop describe briefly.
4. Differentiate between the following –
 - i. Mallet and Hammer
 - ii. Tapping and Dieing

DIPLOMA-3RD SEM-CST-THEORY

PAPER NAME: COMPUTER PROGRAMMING

PAPER CODE: CST201

1. Discuss the history of the C programming language and its key characteristics.
2. Explain the different types of files in C (source, header, object, binary executable) with examples.
3. Explain the use of various operators in C with examples. Discuss the concepts of operator precedence and associativity.
4. Discuss decision-making statements in C with examples. Include the use of the if, else-if ladder, and switch case statements.
5. Describe looping structures in C. Discuss entry-controlled and exit-controlled loops with examples

PAPER NAME: SCRIPTING LANGUAGE (PYTHON)

PAPER CODE: CST203

1. Explain the characteristics of the following data types in Python: tuple, list, dictionary, and array.
2. Write a program using loops and conditional blocks to print all prime numbers between 1 and 100.
3. Describe the functions re.match(), re.search(), and re.findall(). Provide examples for each.
4. What is the difference between a for loop and a while loop in Python?
5. What is the difference between a list and a tuple in Python?

PAPER NAME: DATA STRUCTURES

PAPER CODE: CST205

1. Discuss the classification of data structures. Differentiate between linear and non-linear data structures.
2. What is a stack? Explain its operations using array representation.
3. Describe the algorithm to evaluate a postfix expression using a stack.
4. Differentiate between simple queue, circular queue, and double-ended queue (Deque) with diagrams.
5. Write a recursive function to find the GCD of two numbers and explain its working.
6. Describe the operations of a doubly linked list and explain the advantages of a doubly linked list over a singly linked list.

PAPER NAME: COMPUTER SYSTEM ORGANIZATION

PAPER CODE: CST207

1. Explain the functional units of a computer system. How does the Von-Neumann architecture differ from Harvard architecture?
2. What is a bus structure? Describe the types of buses used in computer organization with neat diagrams.
3. Discuss fixed-point and floating-point data representation in detail. Explain with suitable examples.
4. What are error-detecting codes? Explain the working of parity bits and Hamming code with an example.
5. Describe register transfer operations. Write short notes on memory transfer operations with examples.
6. Explain arithmetic, logic, and shift micro-operations. How are these combined in an Arithmetic Logic Shift Unit (ALU)?

PAPER NAME: ALGORITHMS

PAPER CODE: CST209

1. Discuss the essential characteristics of algorithms with examples.
2. Explain Insertion Sort with an example and its time complexity.
3. Explain the Linear Search algorithm with complexity analysis.
4. Explain Prim's Algorithm for MST with example.
5. Explain Dijkstra's algorithm.

DIPLOMA-3RD SEM-CST-PRACTICAL

PAPER NAME: COMPUTER PROGRAMMING LAB

PAPER CODE: COPC211

1. Create a simple C program that adds two numbers. Save the program as a .c file. Then, explain the role of the following files generated during compilation:
 - Source file (.c)
 - Header file (.h)
 - Object file (.obj or .o)
 - Executable file (.exe or binary)

2. Write a C program to demonstrate the use of:

- Arithmetic operators
- Relational operators
- Logical operators
- Typecasting from float to int and vice versa

3. Write a C program that takes an integer input (1-7) from the user and displays the corresponding day of the week using:

- if-else ladder
- switch statement

4. Write a C program to store marks of 5 students in an array and calculate:

- Total marks
 - Average marks
- Also, explain how arrays are better than using multiple variables for this task.

5. Write a C program that demonstrates the use of:

- scanf() and printf() for formatted input and output
- sizeof() operator for finding the size of int, float, char, and double data types

PAPER NAME: SCRIPTING LANGUAGES LAB

PAPER CODE: CST213

1. Write a script to calculate the sum and average of the first **n** natural numbers (where **n** is input by the user).
2. Write a Python program to compute the GCD and LCM of two numbers input by the user.
3. Write a program to check if a number is prime.
4. Write a Python program to generate the first **n** Fibonacci numbers.
5. Write a program to remove empty strings from a list of strings.

PAPER NAME: DATA STRUCTURE LAB

PAPER CODE: CST215

1. Write a program to implement a circular singly linked list. Include insertion and deletion at first, last, and a specific position.
2. Implement a circular doubly linked list with insertion and deletion operations.
3. Write a program to implement a stack using linked list with push, pop, and display operations.
4. operations.
5. Implement a B-tree of order 3 or 4. Include insertion and display operations.
6. Write a program to find the shortest path in an unweighted graph using BFS traversal.

DIPLOMA-3RD SEM-CE-THEORY
PAPER NAME: CONSTRUCTION MATERIALS
PAPER CODE: CE-PC-301

1. a) Explain the scope of construction materials in: i) Building construction, ii) Transportation engineering, iii) Irrigation engineering.
b) Discuss the criteria for selection of construction materials with respect to strength, durability, eco-friendliness, and economy.
c) A public building requires materials that should last at least 75 years with minimum maintenance. Suggest two suitable natural materials and two artificial materials with justification.
- 2.a) List the requirements of good building stones. Explain briefly the methods of quarrying and dressing of stones.
b) A timber log is 300 mm × 300 mm in cross-section and 3 m long. If its density is 750 kg/m³, calculate its weight.
c) Write short notes on: i) Defects in timber ii) Uses of bamboo in construction
- 3.a) Describe the manufacturing process of burnt clay bricks with neat flow diagram. State the field tests of good bricks.
b) Differentiate between solid, hollow, and pavement precast concrete blocks with their specific uses.
c) A brick wall is 4.5 m long, 3 m high, and 230 mm thick. If the number of bricks required per cubic meter of brickwork is 500, estimate the total number of bricks needed for the wall (neglect mortar joints).
- 4.a) Explain the importance of thermal and sound insulating materials in modern construction. Give two examples of each.
b) Write short notes on:
i) Waterproofing materials
ii) Termite-proofing materials
c) A roof surface area of 120 m² needs waterproofing. If 1 litre of waterproofing compound covers 4 m², calculate the quantity of compound required.
6. a) List the different types of paints and varnishes and state the situations where each is used.
b) Discuss the uses of industrial and agro-waste materials in civil engineering construction with examples.
c) A room of wall area 60 m² is to be painted with oil paint. If 1 litre of paint covers 8 m² for one coat and two coats are required, calculate the total paint required.

PAPER NAME: BASIC SURVEYING
PAPER CODE: CE-PC-302

1. (a) Define surveying. Explain its purpose and classification into primary and secondary, with examples.
(b) Write short notes on plain scale, diagonal scale, and vernier scale with neat sketches.
(c) Construct a diagonal scale of R.F. = 1/400 to read meters, decimeters, and centimeters. Show a length of 5.36 m on the scale.

2. (a) List the instruments used in chain surveying and explain the function of ranging rods, cross staff, and optical square.
- (b) Explain different types of errors in chaining and their causes.
- (c) A 30 m chain was found to be 20 cm too short after chaining a line of 500 m. What is the true length of the line?
3. (a) Differentiate between whole circle bearing (WCB) system and reduced bearing (RB) system with examples.
- (b) Explain the concept of local attraction and methods of correcting observed bearings.
- (c) The following bearings were observed with a prismatic compass:
- Line AB = 60°
 - Line BC = 130°
 - Line CD = 210°
 - Line DA = 310°
- Determine the included angles at stations B, C, D, and A.
4. (a) Define benchmark. Distinguish between GTS, permanent, arbitrary, and temporary benchmarks.
- (b) Explain the rise and fall method for reduction of levels with the format of a level book.
- (c) Following staff readings were observed at a leveling station:
- 1.425 m, 2.735 m, 3.125 m (on B.M. of R.L. = 100.000 m),
 - 2.865 m, 1.455 m, 0.985 m, 2.125 m.
- Using the rise and fall method, calculate the reduced levels of each station.
5. (a) Explain the principles of plane table survey and list its advantages and disadvantages.
- (b) Describe the methods of plane table survey (Radiation, Intersection, Traversing, Resection).
- (c) In a plane table survey, the distance between two points on ground is 250 m. If the distance between their plotted positions on the drawing is 12.5 cm, determine the R.F. of the scale used and the scale in meters.

PAPER NAME: MECHANICS OF MATERIALS

PAPER CODE: CE-PC-303

1. (a) Define moment of inertia and radius of gyration. Explain the parallel axis theorem with a neat sketch.
- b) Derive the expression for the moment of inertia of a circular section about its centroidal axis.
- c) Calculate the moment of inertia of an I-section having flange 200 mm $\times$ 20 mm and web 20 mm $\times$ 300 mm about the horizontal centroidal axis.
2. a) Define stress, strain, Hooke's law, and modulus of elasticity. Draw a stress-strain curve for mild steel and indicate important points.
- b) A steel rod of length 3 m and diameter 25 mm is subjected to a tensile load of 50 kN. Calculate:
- i) Stress induced,
 - ii) Strain produced,
 - iii) Extension of the rod,
- (Take $E = 2 \times 10^5 \text{ N/mm}^2$).
- c) Explain the concept of temperature stresses in a uniform bar with an example.
3. a) Define shear force and bending moment. State the relation between load, shear force, and bending moment.
- b) A cantilever beam of length 4 m carries a point load of 20 kN at its free end and a UDL of 5 kN/m over the entire

length. Draw the shear force diagram (SFD) and bending moment diagram (BMD).

c) Find the maximum bending moment in the above beam.

4. a) Derive the flexural equation and define the terms: neutral axis, section modulus, and moment of resistance.

b) A simply supported beam of span 6 m carries a UDL of 10 kN/m. The cross section of the beam is rectangular, 200 mm $\times$ 300 mm. Calculate the maximum bending stress.

c) For the same section, calculate the shear stress distribution when a shear force of 20 kN acts. Draw the shear stress distribution diagram.

5. a) Write short notes with neat sketches on King Post truss and Queen Post truss.

b) A simply supported truss of span 6 m and height 3 m is loaded with a point load of 20 kN at the top joint. Find the support reactions.

c) Using the method of joints, determine the forces in all members of the truss.

PAPER NAME: BUILDING CONSTRUCTION

PAPER CODE: CE-PC-304

1. (a) Classify buildings based on occupancy and structure. Differentiate between load-bearing structure and framed structure with neat sketches.

(b) List the components of a building and explain the function of foundation, plinth, and superstructure.

(c) A building is designed with a live load of 4 kN/m² and dead load of 6 kN/m² on a floor slab of 5 m $\times$ 4 m. Calculate the total load acting on the slab.

2. (a) Explain the step-by-step procedure of site layout before starting construction.

(b) Describe different types of foundations with neat sketches and state their suitability.

(c) A rectangular footing of size 2.0 m $\times$ 1.5 m is subjected to a load of 450 kN. If the safe bearing capacity (SBC) of soil is 180 kN/m², check the safety of the foundation.

3. (a) Explain the construction of brick masonry and stone masonry, mentioning their advantages and disadvantages.

(b) Write short notes on scaffolding, shoring, and formwork with neat sketches.

(c) A wall of 5 m length, 3 m height, and 0.25 m thickness is to be built in brick masonry. If the volume of one brick is 0.0018 m³ (including mortar allowance), calculate the number of bricks required.

4. (a) Differentiate between doors and windows as horizontal communication elements. Write the requirements of a good door.

(b) Explain vertical communication systems in buildings with neat sketches (staircases, ramps, lifts).

(c) A room measures 6 m $\times$ 4 m $\times$ 3 m. If the window area provided is 6 m², calculate the percentage of window area to floor area and check whether it satisfies the minimum requirement of 1/8th of floor area for ventilation.

5. (a) Discuss the different types of floor finishes and their suitability in residential and industrial buildings.

(b) Explain the construction and advantages of flat roofs and pitched roofs.

(c) A building has a cement concrete floor of area 60 m² and thickness 100 mm. If the density of concrete is 2400 kg/m³, calculate the total weight of concrete used in the floor.

PAPER NAME: CONCRETE TECHNOLOGY
PAPER CODE: CE-PC-305

1. (a) List and explain the different grades of OPC as per IS codes. Compare OPC with Rapid Hardening Cement and Sulphate Resisting Cement in terms of applications.
(b) Discuss the effect of improper storage of cement on its strength and setting properties.
2. (a) Explain the properties of fine aggregates (specific gravity, bulk density, water absorption, bulking of sand) with IS specifications.
(b) Write short notes on crushed sand and its advantages over natural river sand.
(c) The following data was obtained for coarse aggregate:
 - Weight of oven dry sample = 2500 g
 - Weight of sample after 24 hrs immersion in water = 2550 g
 - Weight of saturated surface dry sample = 2525 gCalculate the water absorption (%) of the aggregate.
3. (a) What is meant by workability of fresh concrete? List the factors affecting workability.
(b) Explain with neat sketches the slump cone test and state its limitations.
(c) A slump cone test gives the following readings:
 - Original height = 300 mm
 - Slump observed = 75 mmDetermine the percentage loss in height of the concrete sample and classify its workability.
4. (a) Describe the step-by-step procedure of mix design as per IS 10262.
(b) Explain the importance of compaction and curing in achieving durable concrete.
(c) A concrete cube of 150 mm side fails at a load of 450 kN at 7 days. Calculate the compressive strength and comment whether it is satisfactory for an M30 concrete (assume 7-day strength is 65% of 28-day strength).
5. (a) Write short notes on: Ready Mix Concrete, Lightweight Concrete, and Fiber Reinforced Concrete.
(b) Explain the precautions required for concreting in cold weather.
(c) A beam of size 300 mm × 450 mm × 5 m is to be cast with M25 concrete. If the density of concrete is 2400 kg/m³ and the mix proportion is 1:1.5:3 (cement:sand:aggregate) with w/c = 0.5, calculate:
 - Volume of concrete
 - Quantity of cement, sand, aggregate, and water required.

PAPER NAME: CIVIL ENGINEERING PLANNING AND DRAWING
PAPER CODE: CE-PC-306

1. a) List the types of lines used in building drawing and explain their significance with neat sketches.
b) Draw the graphical symbols for the following: brickwork, stonework, woodwork, glass, and concrete.
c) An architectural drawing is prepared at a scale of 1:100 on an A2 sheet (420 mm × 594 mm). Calculate the maximum ground area that can be represented on the sheet.

- 2.a) State and explain any four principles of planning for residential buildings with neat sketches.
 b) Define plinth area, carpet area, super built-up area, and FAR with an example.
 c) Prepare a line plan of a residential building with three rooms, kitchen, bath, WC, and staircase as per IS 962 norms. Show dimensions clearly.
- 3.a) Draw a foundation plan of a single-storey 2BHK load-bearing residential building with staircase.
 b) Calculate the rise and tread for a residential staircase of total height 3.3 m and stair hall length 3.6 m. Assume suitable dimensions.
 c) Prepare the schedule of openings (doors & windows) for the above building in tabular form.
- 4.a) Define a culvert. List the different types of culverts with their specific uses.
 b) Draw a half sectional plan and half sectional elevation of a single-span slab culvert (neat sketch with labeling).
 c) A two-hume pipe culvert is required to discharge $0.75 \text{ m}^3/\text{s}$ of water. If the velocity of water through each pipe is 2 m/s , determine the diameter of each hume pipe (use discharge formula ($Q=A \times V$)).
- 5.a) With neat sketches, explain any two types of steel beam connections (beam-to-beam, beam-to-column, column splicing, or column bracket).
 b) Draw the plan, elevation, and side view of a king post truss for a span of 6 m, height 2.5 m, using timber sections.
 c) A fink truss of span 12 m and rise 3 m carries a dead load of 1.2 kN/m^2 and a live load of 1.5 kN/m^2 on the roof covering. Calculate the total load on the truss assuming roof covering area = span $\times$ slope length.

PAPER NAME: TRANSPORTATION ENGINEERING
PAPER CODE: CE-PC-307

1. (a) Discuss the role of transportation in economic development of a country. Compare different modes of transportation in terms of cost, capacity, and suitability.
 (b) Explain the factors affecting road alignment with neat sketches.
 (c) A national highway is to be designed for a design speed of 80 km/h. If the average running speed of vehicles is 60 km/h, calculate the time saved in travelling a distance of 50 km.
2. (a) Define the following terms: Design speed, PCU, Camber, Gradient, Right of Way.
 (b) Differentiate between sight distance, stopping sight distance, and overtaking sight distance with neat sketches.
 (c) Calculate the stopping sight distance (SSD) for a vehicle moving at 72 km/h on a level road. Assume perception-reaction time = 2.5 sec and coefficient of friction = 0.36. Take $g = 9.81 \text{ m/s}^2$.
3. (a) Write short notes on: WBM road, Bituminous road, and Cement concrete road with neat sketches.
 (b) Discuss the tests conducted on road aggregates and explain the significance of impact value and abrasion value.
 (c) A flexible pavement is subjected to a wheel load of 50 kN distributed over a contact area of 0.01 m^2 . Determine the contact pressure transmitted to the pavement.

4. (a) Classify the Indian Railways and mention the different railway zones in India.
(b) Explain different types of rail joints and the causes and effects of creep in rails.
(c) A rail of length 13 m expands by 7.8 mm due to temperature rise. If the expansion gap is kept as 10 mm, determine the remaining gap available. (Take coefficient of expansion of steel = $1.15 \times 10^{-5}/^{\circ}\text{C}$, rise in temperature = 50°C).
5. (a) Explain with neat sketches: track cross section, points and crossings, and turnout.
(b) Discuss the functions of sleepers, ballast, and rail fastenings in railway track construction.
(c) A railway station has to accommodate a train of 500 m length with a yard that provides 10% extra length for operational clearance. Calculate the minimum length of station yard required.

DIPLOMA-3RD SEM-CE-PRACTICAL

PAPER NAME: CIVIL ENGINEERING PLANNING AND DRAWING LAB

PAPER CODE: CEPC308S

1. Design a site plan.
2. Develop a foundation plan.
3. Plan a sewage system .
4. Draw orthographic views.
5. Create an isometric view.

PAPER NAME: CONCRETE TECHNOLOGY LAB

PAPER CODE: CE-PC-309S/III

1. **Soundness Test:** Why is it performed? What are the causes of unsoundness? What apparatus is used?
2. **Fineness of Cement:** What does it measure? How is it tested?
3. **Specific Gravity:** What is its significance? What apparatus is used?
4. **Consistency Test:** How is the water content for normal consistency determined?
5. **Setting Time:** What is the purpose of adding gypsum? What affects setting time?

PAPER NAME: CONSTRUCTION MATERIALS LAB

PAPER CODE: CE-PC-309S/I

1. Define compressive strength, its importance, units, and standard methods like the concrete cube test.
2. Explain fineness modulus and its importance in controlling aggregate fineness.
3. Discuss the effect of aggregate grading and surface texture on concrete properties.
4. Classify different types of bricks and explain the tests for bricks, including the water absorption and efflorescence tests.
5. Describe the ingredients of brick earth and their role.

PAPER NAME: MECHANICS OF MATERIALS LAB
PAPER CODE: CE-PC-309S/II

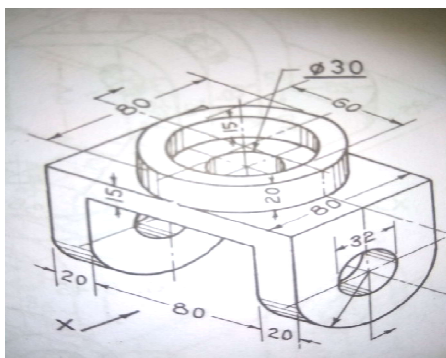
1. Perform a tension test on a mild steel specimen using a Universal Testing Machine (UTM).
2. Identify the load at the limit of proportionality and yield point.
3. Determine the Young's Modulus (E), Proportionality Limit, and Ultimate Tensile Strength.
4. Measure the percentage elongation and percentage reduction in area at failure.
5. Sketch the stress-strain diagram for the tested material, labeling key points.

PAPER NAME: TRANSPORTATION ENGINEERING LAB
PAPER CODE: CE-PC-309S/IV

1. Why is this test considered superior to other abrasion tests?
2. What is the aggregate crushing value and how is it expressed?
3. What are elongation and flakiness indices?
4. How does the water absorption of coarse aggregates influence mix design?
5. What is aggregate impact value?

DIPLOMA-3RD SEM-ME-THEORY
PAPER NAME: MECHANICAL ENGINEERING DRAWING
PAPER CODE: MEPC201

1. A cone of base dia.50 mm & slant height 100mm resting on HP on its base. Develop the lateral surface of the cone.
2. Draw the front view & top view of the cotter.
3. Draw the front view & side view of the given figure.



4. Draw the sectional front view of the flnge coupling.

PAPER NAME: MECHANICAL ENGINEERING MATERIALS
PAPER CODE: MEPC203

- What are Nitriding and Cyaniding?
- What is corrosion? Explain the different mechanism of corrosion.
- What is 18-4-1 high speed steel? What is the maximum solubility of carbon in iron?
- What is the refractory material? State their basic properties and use.
- What is cast iron and how it is manufactured.
- Distinguish between white and grey cast-iron.

PAPER NAME: STRENGTH OF MATERIALS
PAPER CODE: MEPC205

1. A rectangular beam 50mm wide & 100mm deep is simply supported over a span of 5m. If the beam is subjected to central point load of 50 KN, find the maximum bending stress induced in the beam section
2. Calculate the deformation produced in a bar 1m long 30mm wide & 20mm thick when it is subjected to a tensile load of 100 KN. Take E as 200 Gpa.
3. Define the terms- (i) Pure torsion (ii) Bending stress. (iii) modulus of rigidity
4. Obtain a relation for the torque & power that a solid shaft can transmit.
5. Draw the s.f.&b.m .diagram of a cantilever beam with point load at the free end.

PAPER NAME: MANUFACTURING PROCESS-I
PAPER CODE: MEPC207

1. Describe the various kinds of patterns in use. What are the allowances provided, when making a pattern? How does the pattern differ from casting required?
2. Explain various types of casting defects.
3. Explain various types of lathe operation
4. Explain with neat sketch, basic working principle of rolling. Describe its applications in industry.
5. Explain various resistance welding process.
6. Draw a neat sketch and explain metal Extrusion process. Give the example of four extruded products. What are different types of extrusion? Explain.
7. What is forging? Classify the different methods of forging.

PAPER NAME: THERMAL ENGINEERING –I
PAPER CODE: MEPC209

1. Explain the difference between heat pump and refrigerator, also find the C.O.P.
2. Explain the state of equilibrium. Also discuss thermal, chemical and mechanical equilibrium with suitable examples.
3. Explain and derive Steady Flow Energy Equation.
4. Write short notes on following associated with S.F.E.E. (i) Nozzle (ii) Throttle Valve (iii) Turbine
5. Define the term 'Enthalpy'. Derive an expression for change of entropy for following process. (i) Isochoric process, (ii) Adiabatic process.

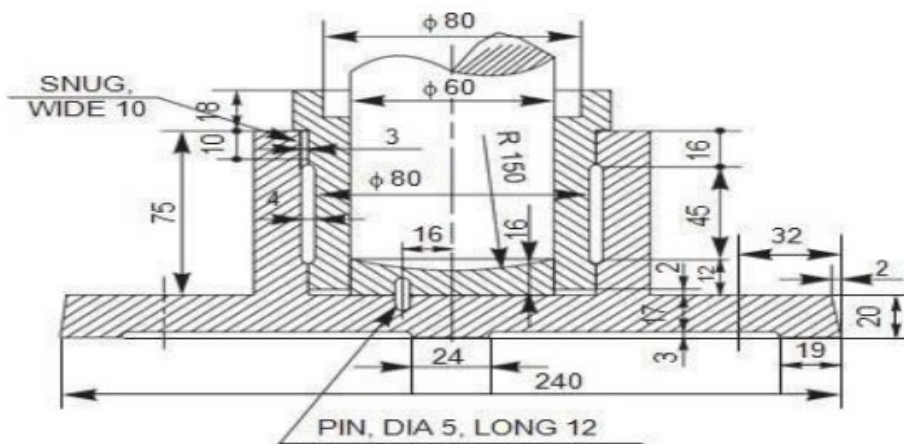
6. A cyclic heat engine operates between a source temperature of 800°C and A Sink temperature of 30°C .What is the least rate of heat rejection per KW net output of the engine?

DIPLOMA-3RD SEM-ME-PRACTICAL

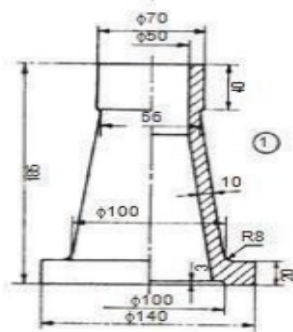
PAPER NAME: MECHANICAL ENGINEERING DRAWING PRACTICE

PAPER CODE: MEPC211

1. A cone of base dia.40 mm & slant height 60mm resting on HP on its base. A section plane cuts the cone at a distance 20mm from the apex at an angle 30° with HP. Develop the lateral surface of the cone.
2. Sketch neatly a knuckle joint for connecting two 40mm diameter rods. Take other suitable important dimension.
3. Draw the sectional front view from the given figure.



4. Draw the sectional front view from the given figure.



PAPER NAME: MATERIALS TESTING LAB

PAPER CODE: MEPC213

1. State & explain Hooke's law.
2. Calculate the deformation produced in a solid steel bar of 1.5m long & 3cm in diameter when it is subjected to a tensile load of 300 KN. Take E as 200 Gpa.

3. A cantilever beam carries two point loads of 200 kN & 400 kN at a distance of 6m from free end & 2.5m from fixed end. If the span of the beam is 8m, draw the S.F. & B.M. diagram of the beam.
4. Explain parallel axis & perpendicular axis theorem.
5. Derive the equations for torsions for non-circular bar.

PAPER NAME: THERMAL ENGINEERING-I LABORATORY
PAPER CODE: MEPC215

1. Determination of dryness fraction of steam by combined separating and throttling calorimeter. What is dryness fraction? What is superheated vapour? What do you understand by triple point? Draw the phase equilibrium diagram for a pure substance on T-S plot with relevant constant property lines.
2. Find the Calorific Value of Diesel Fuel & Coal by Bomb Calorimeter. What is synthetic fuel? How is COM prepared? What are the merits of COM as a boiler fuel? What is swelling index and grindability index of a coal?

PAPER NAME: MANUFACTURING PROCESS-I LABORATORY
PAPER CODE: MEPC217

1. Study of lathe: Identifying its major components: available spindle speed changing devices, available tool feeding devices, feed reversal devices, change gears, job holding devices, tool holding devices, types of cutting tools used in various lathe operations, setting of job and cutting tools, operate lathe without removal of chips and observe job tool relative movement.
2. Practice on making a job involving Lathe operations like facing, planing, turning, step turning, grooving, knurling and chamfering.
3. Study of different equipment of Electric Arc Welding set-up or gas welding set-up or electric resistance welding set-up, hand tools used, safety items used, connection details, types of welding joints (Lap, Butt, Tee, Corner and Edge joints etc.), different welding positions (Horizontal, Vertical and Overhead positions etc.) and practice on edge preparation.

DIPLOMA-3RD SEM-EE-THEORY
PAPER NAME: INTRODUCTION TO ELECTRIC GENERATION SYSTEMS
PAPER CODE: EEPC-201

1. Explain the layout and working of a typical coal-fired thermal power plant.
2. What are the main components of a thermal power plant and their functions?
3. Explain the principle of nuclear fission used in a nuclear power plant.
4. Describe the layout and main components of a nuclear power plant.
5. Draw and explain the layout of a gas turbine power plant.

PAPER NAME: ELECTRICAL CIRCUITS
PAPER CODE: EEPC-205

1. State the Thevenin's Theorem and draw the Thevenin's Equivalent circuit.
2. Explain KVL & KCL.
3. Write down Maximum Power transfer Theorem and explain.

4. Differentiate between active and passive components.
5. Explain the Superposition Theorem.

PAPER NAME: ELECTRICAL & ELECTRONICS MEASUREMENT
PAPER CODE: EEPC-209

1. Short note on the PMMC type instrument (including working, advantages)
2. Short note on the MI type instrument (including working, advantages, disadvantages)
3. Which torque is also called Operating torque ? Give the classification of Restoring torque. Give the classification of Damping torque.
4. How to extend range of an Ammeter ? How to extend range of a Voltmeter ? Draw the circuit diagram of the both cases.
5. Short note on the Electrodynamometer type instrument (including working, advantages, disadvantages)
6. What will happen if Ammeter is connected in parallel & Voltmeter in series ?

PAPER NAME: DC MACHINE AND TRANSFORMERS
PAPER CODE: EEPC-213

1. Explain the Principle of operation of DC Motor.
2. Write a short note commutation Process in DC machine.
3. Explain the Armature Reaction of DC machine..
4. Explain the different types of speed control of DC machine
5. Write down the short notes on parallel operation of two DC machine.

PAPER NAME: ANALOG & DIGITAL ELECTRONICS
PAPER CODE: EEPC-217

1. Discuss the architecture block diagram of P-N Junction& also discuss it's applications.
2. Draw& Explain the architecture of Operational- Amplifier& DIP of IC.
3. What are the functions of a Bipolar Transistor& FET?
4. What is Linear Integrated circuit& UJT?
5. Describe the operations of a Rectifiers & Filters with suitable diagrams.

DIPLOMA-3RD SEM-EE-PRACTICAL
PAPER NAME: INTRODUCTION TO ELECTRIC GENERATION SYSTEMS LAB
PAPER CODE: EEPC 203

1. Draw the schematic of the solar PV plant.
2. Draw the schematic of a micro hydro power plant.
3. Draw the schematic of the parabolic dish CSP plant.
4. Draw schematic of a small diesel generator power plant.
5. Identify the parts of nuclear fired thermal power plant after watching a video program.

PAPER NAME: ELECTRICAL CIRCUITS LAB
PAPER CODE: EEPC 207

1. Verification of super position theorem using hardware and digital simulation.
2. Verification of maximum power transfer theorem using hardware and digital simulation.
3. Verification of Thevenin's theorem using hardware and digital simulation.
4. Verification of series resonance using hardware and digital simulation.
5. Verification of Norton's theorem using hardware and digital simulation.

PAPER NAME: ELECTRICAL & ELECTRONICS MEASUREMENT LAB
PAPER CODE: EEPC 211

1. Measurement of 3-Phase Reactive Power Using Single Wattmeter.
2. Measurement of 3Phase Power With Two Watt meters.
3. Calibration And Testing of Single Phase Electronic Energy Meter.
4. Measurement of Low Resistance By Kelvin's DoubleBridge.
5. Measurement of Medium Resistance Wheatstone Bridge.

PAPER NAME: DC MACHINE AND TRANSFORMERS LAB
PAPER CODE: EEPC 215

1. To plot the OCC of DC shunt generator.
2. Control the speed of the DC shunt motor.
3. Perform the brake test on DC series motor.
4. To obtain the efficiency of DC machine using Swinburne's test.
5. To determine transformer parameters by short-circuit and open circuit test.

PAPER NAME: ANALOG & DIGITAL ELECTRONICS LAB
PAPER CODE: EEPC 219

1. Plot the characteristics of Zenerdiode and find the breakdown voltage.
2. Realization of Half Adder, Full Adder, Half Sub-tractor and Full Sub-tractor.
3. Verification of the function of SR, D, JK and T Flip-flops.
4. Realization of Encoder and Decoder circuit.
5. Realization of Multiplexer and De-multiplexer circuit.

DIPLOMA-5TH SEM-CST-THEORY

PAPER NAME: MICROPROCESSOR & MICROCONTROLLER

PAPER CODE: COPC-301

1. Briefly explain about the programming counters / timers?
2. Explain Memory interfacing (Program and Data memory) of Microcontroller.
3. How Square and triangular waveform generation occurs using DAC? What is Basics of ARM core based controller?
4. Explain the Square wave generation using port pins of 8051.
5. What is meant by the term Water level controller, I/O, Data bus & address bus?

PAPER NAME :IOT

PAPER CODE: COPC303

1. Explain the key elements of an IoT ecosystem. How do technology drivers and business drivers contribute to its growth?
2. Discuss the privacy and security issues associated with IoT systems. How can these issues be mitigated?
3. Describe the roles of sensing and actuation in the Internet of Things. Give suitable examples.
4. What are the major protocol standardization efforts in IoT?
5. Explain M2M and WSN protocols and highlight key challenges in standardization.

PAPER NAME :ADVANCED COMPUTER NETWORK

PAPER CODE: COPE304/II

1. Explain IPv4 subnetting and address classes in detail. Why is subnetting important in modern IP networks?
2. Describe the TCP congestion control algorithms including slow start, congestion avoidance, fast retransmit, and fast recovery.
3. How does MPLS differ from traditional IP routing, and what are its benefits in telecom networks?
4. Explain the various Cellular Technologies – GSM, CDMA, 3G, 4G, and 5G. Highlight the evolution, features, and differences between them.
5. Explain various network security components – VLAN, VPN, Firewall, IPS, and Proxy Servers.

PAPER NAME: THEORY OF AUTOMATA

PAPER CODE: COPE305/I

1. Discuss the minimization of finite automata. Explain the method to distinguish one string from another.
2. Explain Finite Automata with output: Moore and Mealy machines. Discuss their equivalence, applications, and limitations.
3. State and explain Kleene's Theorem. How does it relate finite automata and regular expressions?
4. Explain Arden's Theorem and its application in constructing finite automata from regular expressions.
5. Define Context-Free Grammar (CFG). Explain derivation, derivation trees, and ambiguity in CFG with examples.
6. Explain Push Down Automata (PDA). Describe acceptance by final state and by empty stack. Explain the equivalence of PDA and CFG with an example.

PAPER NAME: COMPUTER GRAPHICS

PAPER CODE: COPE306/I

1. Describe the structure and working of a Color CRT monitor. How does it differ from a monochrome CRT monitor?
2. Explain Bresenham's Line Drawing algorithm. Why is it preferred over other line drawing methods?
3. What is the viewing pipeline in 2D graphics? Explain each stage briefly.
4. Describe the different types of 3D projections: perspective, orthographic, axonometric, and oblique.
5. What is the Flood-Fill algorithm? Describe its working with the help of an example.

DIPLOMA-5TH SEM-CST-PRACTICAL

**PAPER NAME :MICROPROCESSOR & MICROCONTROLLER LAB USING
SIMULATOR/DEBUG**

PAPER CODE: CST-307

1. To add two binary number each 1 bytes long (without & with carry)
2. To add two binary number each 2 bytes long (without & with carry)
3. To add array of 1 bytes numbers
4. To add array of 2 bytes numbers
5. To add two binary number each 4/8 bytes long.

DIPLOMA-5TH SEM-EE-THEORY

PAPER NAME: MICROCONTROLLER & ITS APPLICATIONS

PAPER CODE:EEPC-301

1. Discuss the architecture block diagram of 8051 microcontroller along with its Memory organization and Boolean processor.
2. What is meant by Delay cycle? Explain briefly.
3. Explain the various addressing modes of 8051 Microcontroller.
4. What is meant by 8051 Instruction set & what is programming counters / timers? Explain briefly.
5. Explain priority resolver & also Define instruction cycle and machine cycle.

PAPER NAME: BUILDING ELECTRIFICATION

PAPER CODE: EEPC-305

1. Describe the advantages and disadvantages of various conduit types for electrical installations.
2. Describe the classification of underground cables.
3. Describe safety rules for Electricity.
4. Define: illumination, luminous flux, luminous intensity.
5. Explain the various methods of earthing.

PAPER NAME: INDUSTRIAL DRIVES

PAPER CODE: EEPE-301/2

1. Explain the classification of industrial drives based on power rating and type of load.
2. Describe the role of industrial drives in automation and manufacturing processes.
3. What are the key requirements of an industrial drive system?
4. Explain the advantages of using electrical drives in industrial applications.
5. Describe the working principle of a DC drive used in industrial applications.

PAPER NAME :ILLUMINATION PRACTICES

PAPER CODE :EEPE-305/1

1. Short note on Incandescent Lamp.
2. Short note on the Laws of illumination.
3. Short note on CFL lamp.
4. What is Luminous Intensity ? What do you mean by “Illumination”. What is Beam factor?
5. Derive the factors a) Utilization factor, b) Depreciation factor& c) Maintenance factor.
6. What are the Absorption factor & Reflection factor? What is Lamp efficiency?

DIPLOMA-5TH SEM-EE-PRACTICAL

PAPER NAME: MICROCONTROLLER & ITS APPLICATIONS LAB

PAPER CODE:EEPC-303

1. Interpret details of Hardware kit for Microcontroller and practice to write and execute programs.
2. Identify different menus available in a simulator software RIDE/KEIL and demonstrate their use
3. Develop and execute Assembly language programs using Arithmetic Instructions and demonstrate outcome for a given input data.
4. Develop and execute Assembly language programs using Logical Instructions and demonstrate outcome for a given input.
5. Develop and execute an Assembly language program for Addition of series of 8 bit nos, 16 bit result and demonstrate outcome for a given input data.

PAPER NAME: BUILDING ELECTRIFICATION LAB

PAPER CODE: EEPC-307

1. Prepare wiring installation on a board showing control of lamp,fan and socket.
2. Study and identify cables and catenary cables of different current ratings.
3. Prepare wiring installation board from the commencement of supply.
4. Measurement of energy meter using CT and PT.
5. Wiring layout for installation and make a chart for materials required.

PAPER NAME: INDUSTRIAL DRIVES LAB

PAPER CODE: EEPE-303/2

1. Control the speed of DC motor using armature voltage control method.
2. Control the speed of DC motor using field current control method.
3. Measure the output voltage of chopper for resistive load by varying the frequency and or duty cycle of chopper.
4. Control the speed of three phase squirrel cage induction motor using stator voltage control method.
5. Effect on speed of given DC series motor by varying armature voltage using step down chopper.

PAPER NAME: ILLUMINATION PRACTICES LAB

PAPER CODE:EEPE-307/1

1. Verify The Laws Of Illumination.
2. Prepare Light Dimmer Arrangement Using The Relevant Dimmer Type Of Transformer.
3. Prepare Light Dimmer Arrangement Using The Solid State Dimmer.
4. Conduct Illumination Level Assessment In Workplace Using Lux Meter.
5. Measure The Illumination Output Of Different Lamps.

DIPLOMA-5TH SEM-CE-THEORY

PAPER NAME: WATER RESOURCE ENGINEERING

PAPER CODE:CE-PC-501

1. (a) Define hydrology and explain the hydrological cycle with a neat sketch.
(b) Describe the types of rain gauges used in rainfall measurement.
(c) The rainfall observed at three stations A, B, and C is 120 mm, 150 mm, and 180 mm respectively. Calculate the average rainfall over the catchment using the arithmetic mean method.
2. (a) Define the terms: Duty, Delta, Base period, GCA, CCA, and Intensity of irrigation.
(b) Explain the factors affecting duty and methods of improving it.
(c) The duty of water for a crop is $1200 \text{ hectares/cm}^3$ and the base period is 120 days. Find the Delta of the crop in meters.
3. (a) Classify dams and explain the components and construction methods of an earthen dam with a neat sketch.
(b) Discuss the forces acting on a gravity dam with the help of a diagram.
(c) A catchment area of 50 km^2 has a runoff coefficient of 0.4. If the average rainfall is 120 mm, calculate the runoff volume in cubic meters.
4. (a) Explain the layout and working of a bandhara irrigation scheme with neat sketches.
(b) Discuss the merits and demerits of drip irrigation and sprinkler irrigation.
(c) A well of 3 m diameter yields $2.5 \text{ m}^3/\text{min}$. Calculate the daily discharge in hectares-cm.
5. (a) Differentiate between weir and barrage with neat sketches.
(b) Explain different types of canal cross-sections (in embankment, cutting, and partial cutting/embankment) with neat sketches.

(c) A canal has a bed width of 10 m, depth of water 2 m, and side slopes of 1:1. Find the area of the canal section and the wetted perimeter.

PAPER NAME: ESTIMATING COSTING AND VALUATION
PAPER CODE: CE-PC-502

1. (a) Define estimating and costing. Explain the purpose of administrative approval and technical sanction.
(b) Discuss different types of estimates with their uses (revised, supplementary, repair & maintenance, renovation).
(c) Prepare an approximate estimate for a road of 1 km length, 7 m width, and 0.25 m thickness, assuming the cost of construction is ₹1800 per m³.
2. (a) What is an approximate estimate? State its purpose.
(b) Explain the plinth area method and cubical content method with neat sketches.
(c) A building has a plinth area of 250 m² and the plinth area rate is ₹15,000/m². Estimate the approximate cost of the building including 5% contingency.
3. (a) Define detailed estimate. List the data required before preparation.
(b) Explain the long wall–short wall method and centre line method of taking out quantities.
(c) Prepare the bar bending schedule (BBS) for a slab of size 4 m × 5 m, thickness 150 mm, reinforcement 12 mm @ 150 mm c/c both ways. Assume suitable cover and lapping.
4. (a) What is the purpose of rate analysis? List the factors affecting the rate of an item.
(b) Explain the concept of lead and lift with examples.
(c) Prepare a rate analysis for 1 m³ of brick masonry in cement mortar (1:6), assuming the cost of materials and labour as per PWD schedule of rates.
5. (a) Define valuation. State its purpose and importance.
(b) Write short notes on: scrap value, salvage value, sinking fund, depreciation.
(c) A property has a purchase price of ₹20,00,000. Its salvage value is ₹2,00,000 and life is 40 years. Calculate the annual depreciation using:
 - Straight-line method
 - Sinking fund method (at 6% interest)

PAPER NAME: TRAFFIC ENGINEERING
PAPER CODE: CE-PE-506/II

1. (a) Define traffic engineering. State its objects and scope.
(b) Explain the PIEV theory and the factors affecting reaction time of drivers.
(c) A vehicle moving at 72 km/h applies brakes, and the coefficient of friction between road and tyre is 0.35. Assuming reaction time of the driver is 2.5 sec, calculate the stopping sight distance (SSD).
2. (a) What is the necessity of an Origin & Destination study? Explain its different methods.
(b) Describe the procedure of traffic volume count survey and representation of data.

(c) At a spot, the speeds of 10 vehicles are recorded in km/h as:
45, 50, 55, 40, 60, 65, 50, 55, 45, 60.

Compute the average speed and standard deviation of the data.

3. (a) What are traffic control devices? State their necessity and types.

(b) Classify road signs as per IRC: 67 with neat sketches.

(c) Explain the classification of traffic markings. Draw neat sketches showing carriageway markings and kerb markings.

4. (a) Define traffic signals. Discuss the types of traffic control signals.

(b) With neat sketches, explain diamond intersection and cloverleaf intersection.

(c) At an intersection, the traffic volume on four approaches is given as:

- North approach: 600 PCU/hr
- South approach: 500 PCU/hr
- East approach: 400 PCU/hr
- West approach: 300 PCU/hr

Design the signal cycle length using Webster's method.

5. (a) Define road accidents. State their types and causes.

(b) Explain the necessity and types of street lighting systems.

(c) A street light is provided at a spacing of 30 m with a lumen output of 5000 lumens per lamp and an efficiency of 50%. Calculate the average illumination on the road of 7 m width.

PAPER NAME: BUILDING SERVICES AND MAINTENANCE

PAPER CODE: CE-PE-507/I

1. (a) Define building services. Explain their necessity in modern buildings with examples.

(b) Discuss the role and responsibilities of a Building Services Engineer and licensed plumber.

(c) A smart commercial building requires HVAC, plumbing, fire safety, lifts, and solar heating systems.

Prepare a checklist of services to be integrated into the Building Management System (BMS).

2. (a) List the different modes of vertical communication in buildings. Explain the functional requirements of lifts and escalators.

(b) Draw a neat sketch showing the component parts of a lift and explain their functions.

(c) A multi-storeyed apartment has 200 flats. If one lift can serve 50 flats efficiently, calculate the minimum number of lifts required. Also, suggest provisions for a ramp for physically handicapped persons, given that the maximum permissible gradient is 1:12.

3. (a) What are the causes of fire in multi-storeyed buildings? Explain the National Building Code provisions for fire safety.

(b) Differentiate between fire detecting systems and fire extinguishing systems with examples.

(c) A cinema hall has a seating capacity of 800 persons. If the evacuation time must not exceed 3 minutes, calculate the minimum exit width required, assuming the unit width of exit door is 0.5 m and discharges 25 persons per minute.

4. (a) Explain the importance of plumbing services in residential and commercial buildings.

(b) Describe the one-pipe system and two-pipe system of drainage with neat sketches.

(c) A building requires a daily water supply of 60,000 litres. If the overhead tank has a storage capacity of

15,000 litres, calculate the minimum number of refilling cycles per day. Suggest the suitable type of pump and pipe material for this case.

5. (a) Differentiate between natural and artificial lighting. List the factors influencing the brightness of a room.

(b) Define ventilation and explain its types with examples.

(c) A lecture hall of $15\text{ m} \times 10\text{ m} \times 4\text{ m}$ is proposed to be provided with air changes per hour (ACH) = 6.

Calculate the volume of fresh air (in m^3/hr) required for proper ventilation. Suggest suitable acoustic materials to improve sound quality in this hall.

PAPER NAME: SAFETY ENGINEERING & MANAGEMENT IN THE CONSTRUCTION
PAPER CODE: CE-PC-510

1. (a) Define Safety Philosophy. Explain the physical, physiological, and psychological factors affecting safety at construction sites.
(b) Discuss the importance of Safety Education and Training and the role of employee participation in promoting a behavioral safety culture.
(c) A factory has 1,200 workers. If the accident rate is 4 accidents per 1,000 workers per year, calculate the expected number of accidents per year. Also, explain how the Factories Act provisions can help reduce such incidents.
2. (a) Explain the key elements of a Safety Management System with reference to ISO 45001:2018.
(b) List and explain types of occupational health hazards commonly found in construction industries. Give suitable preventive measures for each.
(c) A construction site requires 150 helmets, 200 pairs of safety shoes, and 180 pairs of gloves. If the average life span of each PPE item is 2 years and the replacement cost is ₹900 per worker per year, estimate the total PPE expenditure for 3 years.
3. (a) Describe the safety precautions to be followed in (i) underground construction works, (ii) stacking and storage of gas cylinders, and (iii) working at heights.
(b) Explain the laws and regulations related to safety in construction under the Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act.
(c) A tower erection project requires workers to work at a height of 30 m. If the safety factor for scaffolding is 4 and the maximum load per worker is 80 kg, calculate the minimum load-carrying capacity (in kg) of scaffolding for 10 workers.
4. (a) Differentiate between domestic hygiene and industrial hygiene. Why is industrial hygiene particularly important in construction sites?
(b) List common physical hazards in construction (heat stress, noise, vibration, illumination, radiation) and suggest suitable control measures for each.
(c) Noise levels at a construction site were recorded as 95 dB for 6 hours per day. If the permissible exposure limit is 90 dB for 8 hours, determine whether the noise level exceeds safe exposure. Use the concept of Noise Dose (%) for calculation.
5. (a) Discuss the importance of strategic management and planning for prevention and control of contaminant discharge in construction industries.
(b) Explain the role of safety audits, non-compliance reports, and post-audit compliance in ensuring workplace safety.

DIPLOMA-5TH SEM-CE-PRACTICAL

PAPER NAME:DESIGN OF RCC AND STEEL STRUCTURE PRACTICES (LAB)

PAPER CODE: CEPC503S

1. **Slab Design:** Design a one-way reinforced concrete slab to carry a given uniformly distributed load, focusing on bending and deflection for a unit width.
2. **Column Design:** Design an axially loaded reinforced concrete column with specific dimensions and a given factored load, including detailing reinforcement and detailing the column.
3. **Anchorage Length:** Calculate the anchorage length for different types of bends (e.g., 45° and 90°) for a specific diameter of reinforcement bar.
4. **Connection Design:** Design a double cover butt joint to connect two plates of specified thickness, including determining the number of rivets or bolts required and their arrangement.
5. **Beam Design:** Design a simply supported rolled steel beam to carry a given uniformly distributed load over a specific span, considering self-weight and other loads.

PAPER NAME:ESTIMATING,COSTING AND VALUATION PRACTICES (LAB)

PAPER CODE: CEPC504S

1. **Bar Bending Schedule:** Prepare bar bending schedules for elements like RCC beams, columns, and lintels.
2. **Quantity Calculation:** Determine quantities of materials like concrete for slabs and beams.
3. **Rate Analysis:** Calculate the cost per unit (e.g., cubic meter or square meter) for items like brick masonry, concrete, plaster, and flooring.
4. **Purpose of Valuation:** Understand the importance of valuation in projects.
5. **Ancillary Items:** Estimate items like septic tanks and surface drains.

PAPER NAME:WATER RESOURCE ENGINEERING PRACTICES (LAB)

PAPER CODE: CEPC505S

1. **Precipitation:** Measure and analyze rainfall using different types of rain gauges (recording and non-recording) and determine average rainfall over a catchment area using methods like the Isohyetal method.
2. **Runoff:** Calculate the volume of runoff from a given storm and estimate the ϕ -index of the catchment, which represents the average infiltration rate.
3. **Infiltration:** Define infiltration and infiltration indices, explain its measurement using infiltrometers, and apply formulas like Horton's equation to understand infiltration processes.
4. **Evaporation & Evapotranspiration:** Explain the factors affecting these processes and the methods for their measurement.
5. **Bernoulli's Theorem:** State the theorem, its assumptions, and apply it to solve problems related to water flowing through pipes, such as calculating total head.

DIPLOMA-5TH SEM-ME-THEORY
PAPER NAME: POWER ENGINEERING
PAPER CODE: MEPC301

1. Explain the working principles of Otto cycle, Diesel cycle, and Dual combustion cycle with the help of P–V and T–S diagrams. Derive the expressions for the thermal efficiency of Otto and Diesel cycles. (Include one simple numerical example).
2. Classify I.C. engines on different bases (fuel used, cycle of operation, method of ignition, cylinder arrangement, etc.). Write short notes on the classification with examples.
3. Describe the construction, working principle, and function of major components of an I.C. engine. Compare the operation of a two-stroke petrol engine with a four-stroke petrol engine, and a two-stroke diesel engine with a four-stroke diesel engine.
4. Draw and explain the hypothetical and actual indicator diagrams of two-stroke and four-stroke petrol and diesel engines. Discuss the reasons for deviation of actual diagrams from hypothetical ones.
5. Explain the valve timing diagrams of two-stroke and four-stroke engines (both petrol and diesel). Discuss the significance of valve overlap.
6. Write short notes on the following: Firing order of multi-cylinder engines Pre-ignition and detonation Knocking in petrol and diesel engines Scavenging, supercharging, and turbocharging Simple carburettor and MPFI system
7. Explain the purpose of lubrication and cooling in I.C. engines. Discuss different lubrication methods and types of cooling systems used. Q8. Define indicated power, brake power, and friction power of an I.C. engine. Explain the Morse test used for measuring friction power. Derive the expression for mechanical efficiency.

PAPER NAME: ADVANCEDMANUFACTURING PROCESSES
PAPER CODE :MEPC303

1. Discuss the mechanism of material removal for Abrasive jet machining (AJM). State their limitations.
2. What are the over voltages in ECM process. Classify and Explain them.
3. Write the laws on which the electro-chemical machining depends.
4. Explain the orbital AFM process.
5. Write down the need of N.T.M process. Write the difference between traditional and nontraditional machining process.
6. Explain with figure the Ultrasonic machining (USM) process with its varies components.
7. Describe with neat sketch the working principle of Laser beam machining (LBM)?
8. Describe with fig. ECM process. Write advantages disadvantages of its.
9. Explain with a neat sketch the operation of the canned cycle G81 as per ISO.

PAPER NAME: FLUID MECHANICS & MACHINERY
PAPER CODE: MEPC309

1. State & explain Bernoulli's theorem.
2. Define Atmospheric pressure, Gauge pressure, Vacuum pressure & Absolute pressure.
3. A U-tube containing Mercury has its right limb open to atmosphere & left limb connected to a pipe conveying water under pressure, the difference in levels of Mercury in the two limbs being 100mm. If the mercury level in the left limb is 200mm below the centreline of the pipe, find the gauge & absolute pressure in the pipe line.
4. Explain the terms incompressible flow, steady flow & laminar flow.
5. Define & derive continuity equation in steady flow.

PAPER NAME : POWER PLANT ENGINEERING
PAPER CODE: MEPE301/1

1. Explain the basic concept of a power plant with a neat schematic diagram.
2. Describe the current power scenario in India and in the world with suitable data.
3. Write a short note on the classification of power plants based on source of energy and nature of service.
4. Discuss the future trends in power generation with special reference to renewable energy sources.
5. Explain the general criteria for selecting a site for a thermal power plant.
6. List the factors affecting the selection of site for a hydro power plant with diagram.
7. Compare the advantages and limitations of non-conventional power plants over conventional power plants.
8. Write the working of a Thermal Power Plant

PAPER NAME : AUTO MOBILE ENGINEERING
PAPER CODE: MEPE303/2

1. Explain how the power can be transmitted in front wheel drive by using a neat diagram.
2. Briefly discuss the working principle of a simple Carburetor system with neat sketch
3. Explain common rail diesel injection system with necessary diagram.
4. What is the function of suspension system?
5. Explain the construction working and performance of a fluid flywheel. Enumerate the advantages of fluid flywheel over the other types of clutches.
6. Draw and explain with a simple sketch, working of a constant mesh gear box.
7. Explain with a simple sketch, construction and working of differential in a automobile
8. With the help of a schematic diagram, explain Ackerman steering mechanism.

DIPLOMA-5TH SEM-ME-PRACTICAL
PAPER NAME: POWER ENGINEERING LAB
PAPER CODE: MEPC311

1. Explain with neat sketches the construction and working of a Two-Stroke IC Engine. Identify and describe the functions of its main components.

2. Differentiate between the working of a Four-Stroke Petrol Engine and a Four-Stroke Diesel Engine with the help of valve timing diagrams.
3. Describe the procedure to conduct a performance trial on a Petrol Engine Test Rig. How are Brake Thermal Efficiency (BTE) and Brake Specific Fuel Consumption (BSFC) calculated?
4. What is the Morse Test? Explain its working principle and describe the step-by-step method to determine the approximate Indicated Power (IP) of a multi-cylinder IC Engine.
5. With the help of a suitable diagram, explain the working of the Water Cooling System and Lubrication System in IC engines. Identify their major components and state their functions.

PAPER NAME: ADVANCE MANUFACTURING PROCESS LAB

PAPER CODE: MEPC313

1. Prepare a chart showing the working principle and setup of Ultrasonic Machining (USM) for demonstration purpose and also prepare a detailed study report on working principle, setup, process parameters, advantages, limitations and applications of Ultrasonic Machining (USM).
2. Prepare charts showing the working principle and setup of Electrical Discharge Machining (EDM) and Wire-EDM for demonstration purpose and also prepare a detailed study report on working principle, setup, process parameters, advantages, limitations and applications of Electrical Discharge Machining (EDM) and Wire-EDM
3. Prepare a chart showing the working principle and setup of Electrochemical Machining (ECM) for demonstration purpose and also prepare a detailed study report on working principle, setup, process parameters, advantages, limitations and applications of Electrochemical Machining (ECM)..

PAPER NAME: FLUID MECHANICS & MACHINERY LAB

PAPER CODE :MEPC315

1. Explain with neat sketch function of pitot tube with set up.
2. Explain Bernoulli's theorem with assumption.
3. Explain with neat sketch the application of venturimeter.
4. Describe with sketch verification of Bernoulli's theorem

PAPER NAME :AUTOMOBILE ENGINEERING LAB

PAPER CODE: MEPE305

1. Explain the functioning of independent front wheel suspension system with torsion bar in automobile.
2. Explain with a suitable schematic diagram, working of hydraulic braking system in a vehicle. Briefly discuss the functional requirements of braking fluids.
3. Explain the working of single plate clutch with the help of suitable diagram.
4. Explain MPFI system with neat diagram.
5. Explain electric system of automobile.
6. How air conditioning systems work on automobile?